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The description-experience gap and its relation to instructional control: Do people rely more on their experience than in objective descriptions?

La brecha descripción-experiencia y su relación con el control instruccional: ¿Las personas confían más en su experiencia que en descripciones objetivas?

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Abstract

The present work aims to reveal contradictory results obtained on two different fields; particularly from two studies conducted on the description-experience gap field showing that descriptions are neglected when personal experience is available [1,2], and several others conducted on the instructional control field getting to the opposite conclusion [3–8]. To account for this contradiction, we hypothesized that participants from the studies of Jessup, Bishara and Busemeyer [1] and Lejarraga and Gonzalez [2] relied on their experience rather than on the descriptions because of the difficult, demanding nature of the probabilistic descriptions they faced. Enriched descriptions were created in our experiment to assess the contribution of this factor to the differential influence of the descriptions in choice behavior. Nonetheless, our hypothesis did not find support in the results and further research is needed to account for the aforementioned contradiction.

Keywords

description-experience gap; decision making; instructional control

Resumen

El presente trabajo pretende revelar resultados contradictorios obtenidos en dos áreas diferentes; concretamente de dos estudios realizados en el área de la brecha descripción-experiencia mostrando que las descripciones son ignoradas cuando hay disponible experiencia personal [1,2], y bastantes estudios realizados en el área del control instruccional llegando a la conclusión opuesta [3–8]. Para dar cuenta de esta contradicción, hipotetizamos que los participantes de los estudios de Jessup, Bishara y Busemeyer [1] y Lejarraga y Gonzalez [2] confiaban más en su experiencia que en las descripciones por la naturaleza difícil y demandante de las descripciones probabilísticas que veían. En nuestro experimento fueron creadas descripciones enriquecidas para evaluar la contribución de este factor a la influencia diferencial de las descripciones en la conducta de elección. Sin embargo, nuestra hipótesis no encontró respaldo en los resultados y será necesaria investigación adicional para resolver la contradicción mencionada.

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Palabras clave
brecha descripción-experiencia; toma de decisiones; control instruccional

Introduction

Between the different Psychology paradigms, not only theoretical but also empirical differences are found: depending on the definition of the science itself and its study field, the experimental interests will vary greatly among all of them. However, there are certain overlaps on the research fields that could be of benefit to all of us if revealed so we could take advantage of what other researchers, even with different theoretical coordinates, have already done.

The present work aims to reveal contradictory results obtained on two different fields; particularly from two studies conducted on the description-experience gap field showing that descriptions are neglected when personal experience is available [1,2], and several others conducted on the instructional control field getting to the opposite conclusion [3–8]. In order to disentangle this contradiction, we studied how the descriptions of the options are presented in the description-experience gap experiments to understand why they are neglected.

When confronted with formally expressed probabilities, we tend to overweight low probabilities and underweight high probabilities, as described by Cumulative Prospect theory [9]. Nonetheless, the opposite result is found when we have to experience the probabilities of the events ourselves rather than reading them, giving its origin to a phenomenon called the description-experience gap [10,11].

In tasks involving description-based choices, two gambles are shown to the individuals in a text and/or graphic way (see [12] for a meta-analysis). Participants have all the information available from the beginning, that is, the outcomes values and probabilities are known.

In tasks involving experience-based choices, two options are shown to the participants in a symbolic way (e.g. doors, bags, buttons, etc.) (for a review of recent research, see [13]). Therefore, they know nothing about the outcomes values and probabilities, being only able to infer them by sampling (with or without real consequences) from both options.

Barron and Erev [10] published the first paper which explicitly compares on the same paper description-based with experience-based choices. More specifically, these authors made ten comparisons between both types of choices and found statistically significant differences in four of them: choice behavior was demonstrated to be different depending on how the information is achieved – through description or experience. The group facing experience-based choices obtained a reversed common ratio/certainty effect, higher risk seeking scores in the gain compared to the loss domain, and seemed to underweight small probabilities [10].

Following Barron and Erev's work, other researchers have studied the description-experience gap, both in basic tasks involving points/money and in applied tasks such as social cooperation [14], online product reviews [15], climate change [16,17] and medical decisions [18].

Still, little is known about the description-experience gap paradigm when both sources of information are available. On that sense, Jessup, Bishara and Busemeyer [1] divided the participants in two groups and found that the presence of feedback on repeated decisions from description (*'mixed group'*) altered the choice behavior compared to the group without feedback *('description group'*). Subjects on the *mixed group* were shown the possible outcomes and probabilities, at the same time that were allowed to play the same gamble repeatedly so they could learn the outcomes distributions from their experience too. Subsequently, Lejarraga and Gonzalez [2] conducted an experiment using three groups: *description, experience* and *mixed*. The results showed that choice behavior of the subjects from the *mixed group* was statistically different from those of the *description group* and almost identical to those of the *experience group*. The authors concluded that when both sources of information are available, individuals neglect the descriptions [2].

Nonetheless, these results regarding a higher control on behavior of experience compared to descriptions [1,2] seem to contradict previous research on instructional control. Instructional control or rule-governed behavior is a research

field where the differential influence of both experimental instructions and contingencies can be assessed [19]. Different studies have demonstrated that, in the presence of instructions –descriptions–, participants' behavior is often insensitive to schedule contingencies –experience– [3–8]. It has been shown too that having both sources of information affects individuals differently than having just their own experience in standard choice tasks [20,21] or even the prisoner dilemma [22].

The inconsistency on the results from the above enlisted studies (i.e. experience being neglected in the presence of descriptions) and those of Jessup, Bishara and Busemeyer [1] and Lejarraga and Gonzalez [2] (i.e. descriptions being neglected in the presence of experience) serves as the theoretical context for the present study, as an explanation to account for this discrepancy is needed.

To account for this contradiction, we hypothesized that participants from the *mixed groups* from Jessup, Bishara and Busemeyer [1] and Lejarraga and Gonzalez [2] relied on their experience rather than on the descriptions because of the difficult, demanding nature of the standard probabilistic descriptions of the options. Indeed, Lejarraga and Gonzalez [2] also had groups with descriptions that were very complex and difficult to understand, and found no difference between these groups and the original ones [2]. This result supports our hypothesis, as subjects treat the standard descriptions of the problems the same way they do with descriptions that are clearly hard to understand in order to make their choices.

Additionally, some authors have demonstrated that the presentation format of the description-based tasks affects choice behavior on the description-experience gap [23–25]. Therefore, we hypothesize that if participants on the *mixed group* had a better comprehension of the descriptions, their behavior would be more similar to the *description* rather than the *experience group,* and therefore being coherent with previous research on instructional control.

Method

Two choice tasks involving probabilities were presented to the participants in a 3 x 2 design with 3 levels of source of information available –only description, only experience or both– and 2 levels of information available on the descriptions –original or enriched–. The *experience group* is insensitive to the second factor, as there are no descriptions given on it. Therefore, five groups were formed.

The *description*, *experience* and *mixed groups* were used to replicate the original results from Lejarraga and Gonzalez [2] in order to not confound population effects, while the remaining two groups –*enriched description* and *enriched mixed*– served to test the effect of enriched descriptions on the subjects' choice behavior.

In tasks involving typical, probabilistic descriptions, some participants may be able to calculate the relative frequencies of each outcome and the expected value of the options and make their choice based on that information, while others cannot. By using enriched descriptions including this information we aimed to turn this extraneous variable into a constant that we deemed fundamental.

Participants

Our sample included 104 students from the University of Minho (85% females, 86% Psychology students). Participants earned a course credit and entered on a raffle of a 20€ FNAC voucher for their participation in the study.

Materials

Participants faced the two choice tasks used by Jessup, Bishara and Busemeyer, and Lejarraga and Gonzalez [1,2] on a computer screen, presented in random order. Nonetheless, due to a design failure, 72% of the subjects (n = 75) faced problem A before problem B.

In each task, the subjects faced a *safe* and a *risky option* associated to two buttons whose position – left or right – was randomized for each participant. The *safe option* would give 3 points for sure in both problems, while the *risky option* would give 4 points with a probability of 80% in problem A and 64 points with a probability of 5% in problem B. At the end of the experiment, participants had to fill a questionnaire about task comprehension and gambling habits. The experimental program was written using the OpenSesame software.

Procedure

Participants were randomly assigned to one of five groups: *description, experience, mixed, enriched description* and *enriched mixed*. On the task' instructions, participants were told that they would do two choice tasks to earn points that would allow them to win a €20.00 FNAC voucher.

Groups differed on the presentation format of the problems (see Table 1). We used the same methodology than Lejarraga and Gonzalez [(2)] to make a fair comparison between publications results. Specifically, the *description* group was presented with the probabilistic description of each problem and had to choose one option. It was said to the participants that the computer would play that option 100 times. The *experience* group faced two unlabeled buttons, and had to choose between both options 100 times. The *mixed* group was presented with both the probabilistic description of the problems, and the experienced outcomes, as they had to choose between them 100 times. The remaining two groups – *enriched description* and *enriched mixed* – were similar to the *description* and the *mixed groups*, respectively, with one exception: the description of the problems were more detailed, as they involved probabilities, frequencies and expected values.

Table 1. Description of the problems for different groups (original in Portuguese)

Problem A	**Problem B**
Experience group descriptions	
"A - B"	"A - B"
Description and *Mixed groups* descriptions	
Safe option: win 3 points for sure.	Safe option: win 3 points for sure.
Risky option: win 4 points with an 80% chance or win 0 points otherwise.	Risky option: win 64 points with a 5% chance or win 0 points otherwise.
Enriched description and *Enriched mixed groups* descriptions	
Safe option: win 3 points for sure.	Safe option: win 3 points for sure.
(You will get 3 points every time you select this option, so you will get a total of 30 points for every 10 times you choose this option.)	(You will get 3 points every time you select this option, so you will get a total of 30 points for every 10 times you choose this option.)
Risky option: win 4 points with an 80% chance or win 0 points otherwise.	Risky option: win 64 points with a 5% chance or win 0 points otherwise.
(On average, you will get 4 points 8 out of 10 times you select this option and 0 points the remaining 2 times. So, on average, you will get a total of 32 points for every 10 times you choose this option.)	(On average, you will get 64 points 1 out of 20 times you select this option and 0 points the remaining 19 times. So, on average, you will get a total of 64 points for every 20 times you choose this option.)

Every choice made by the participants had real consequences for them, as they got as many points as the sum of the outcomes of the 100 trials for both choice tasks. Participants saw, highlighted in red, the amount of points they got in each trial, and also the amount of points they missed on the other option.

Results

Figure 1 shows average proportion of choices of the risky option in blocks of 25 trials for problem A (left panel) and problem B (right panel). Results from Lejarraga and Gonzalez [2] are plotted on the first row to allow visual comparison, while our groups using the original and enriched descriptions are plotted on the second and third row, respectively.

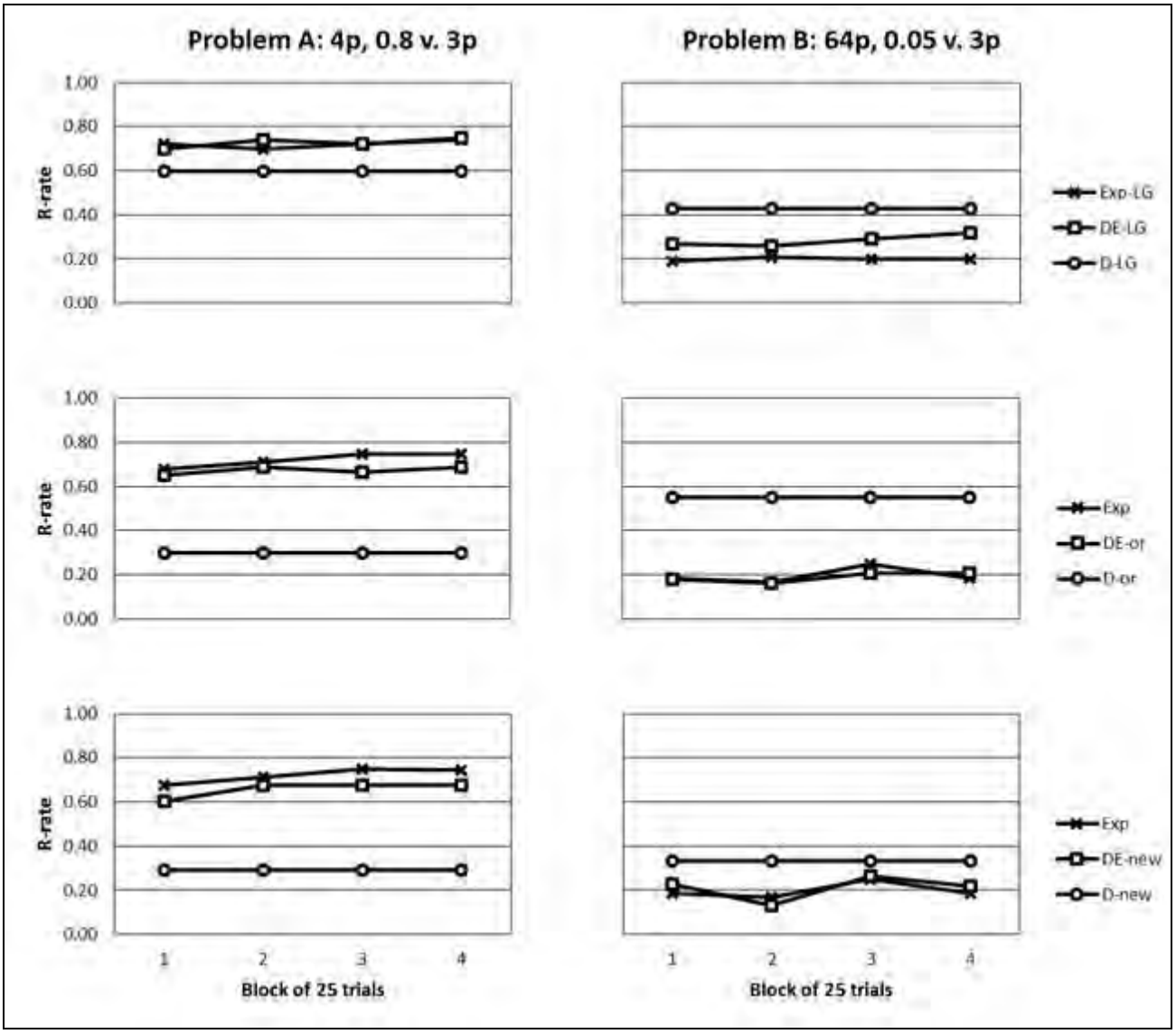

Figure 1. Choice behavior expressed as risky rate in blocks of 25 trials by problems and conditions. Left panels show data for problem A and right panels for problem B. Upper row shows data from the experiment of Lejarraga and Gonzalez [2], middle row shows data for original descriptions and lower row shows data for the new, enriched descriptions.

Results from Lejarraga and Gonzalez [2] were successfully replicated with the exception of the *description group:* our participants' proportion of choices of the risky option –*R-rate*– was lower on problem A while similar on problem B (see upper and middle rows of Figure 1 to compare results from Lejarraga and Gonzalez [2] with our replication).

On the other hand, results showed that introducing more information about the options on the descriptions did not have an effect on choice behavior for either the *description* or the *mixed group* for problem A (see left panel of middle and lower rows of Figure 1). Nonetheless, the type of description did have a differential effect for problem B, as we found a significant description-experience gap as revealed on a one way ANOVA when using the original descriptions, $F(2, 57) = 7.05$, $p = .002$; but no difference between conditions when using our enriched descriptions, $F(2, 61) = 1.14$, $p = .327$.

More specifically, choice behavior was found to be similar for the *mixed* and *experience groups* in problem A both with the original descriptions, $F(1, 38) = 0.91$, $p = .346$; and with our enriched descriptions, $F(1, 38) = 1.51$, $p = .227$. On the other hand, the *mixed* and *description groups* were found to be different both with the original descriptions, $F(1, 38) = 10.67$, $p = .002$; and with our enriched descriptions, $F(1, 42) = 10.94$, $p = .002$.

In problem B, choice behavior was also found to be similar for the *mixed* and *experience groups* both with the original descriptions, $F(1, 38) = 0.02$, $p = .900$; and with our enriched descriptions, $F(1, 38) = 0.05$, $p = .829$. *Mixed* and *description groups* were found to be different when using the original descriptions, $F(1, 38) = 8.15$, $p = .007$; but equal when using our enriched descriptions, $F(1, 42) = 1.15$, $p = .289$.

Regarding the gambling habbits, 19% of our participants responded that they never gamble, while 31%, 33%, 11% and 6% of them responded they play 1, 2, 3 or 4 or more types of gambles, respectively. From those who gamble, the most common frequency was “ocassionally”, followed by “once a month” and “once a week”: 79%, 16% and 5%, respectively.

Discussion

Our study analyzed the effect of accurate, enriched descriptions on choice behavior. In two different problems, five conditions were compared: *description, experience, mixed, enriched description* and *enriched mixed*. Enriched descriptions affected *description groups* in problem B, but had no effect in problem A. On the other hand, they did not affect *mixed group* in problem A, while the assessment of their function in problem B could not be properly assessed, as the variance between groups was null (i.e. it was not possible to compare data from the *mixed group* with *description* and *experience* groups in a differential way, as no significant difference between them was found).

While results from our *mixed* and *experience groups* replicated those from Lejarraga and Gonzalez [2], our *description group* showed a different choice behavior. Lower and higher preferences for the risky option were found in problem A and B, respectively, when comparing our groups with theirs. This difference, probably caused by a population effect, points out the importance of replicating previous results [26], as not doing it before introducing experimental modifications could induce biased comparisons.

The enriched descriptions were proved to be useful for our purpose: turn the information that the participants extract from the descriptions of the options into a constant. The fact that a difference was found between *description* and *enriched description groups* in problem B, shows that, with the original descriptions, the participants could not extract all the information by themselves. This result is coherent with previous studies showing the difficult nature of probabilistic statements to be understood by participants [23–25] and with another result from Lejarraga and Gonzalez [2] showing that participants’ choice behavior did not change when descriptions of the options were highly complex and therefore harder to be understood. Therefore, more research on the participants’ understanding of the descriptions is needed to properly assess how descriptions should be presented in order to maximize their compressibility. Working with graphical descriptions of the options, some authors have suggested that the presentation format is the main explaining factor of the description-gap [23,24].

Regarding our hypothesis about the contradiction between the results obtained on the description-experience gap [1,2] and classic studies on instructional control [3–8,20–22] being caused by incomprehensible descriptions of the tasks, it did not find support in the results. We expected to find the *enriched mixed group* to be similar to the *enriched description* while different from the *experience group* when using enriched descriptions. However, problem A clearly showed the same pattern of results on the *mixed groups* regardless of the type of descriptions that were used, while problem B actually did not show enough variance to look for differences between *mixed group* and the others: as the *enriched description* and *experience groups* did not show statistically significant differences between them, there was not any

possibility to test our hypothesis in this problem, because of the lack of variance between both groups. On this scenario, two possibilities arise: either the enriched descriptions would have had an effect in problem B but the small range prevented it to appear, or they would not have had an effect anyway.

If the first scenario is the case, there would be a clear difference on the importance of the descriptions on a *mixed group* between problems A and B, suggesting that maybe just in some scenarios, the descriptions override the experience, and further research defining those scenarios would be needed in order to understand the factors behind it.

Limitations of our study include uneven proportions of subjects' gender and order of presentation of the problems, and the impossibility to assess whether our enriched descriptions made subjects' choice behavior from the *mixed group* in problem B more similar to either *description* or *experience group.* Using additional problems may shed light to this question in further research.

Besides testing the effect of enriched descriptions with additional problems, there is another experimental idea that is interesting to test our hypothesis regarding subjects' comprehension of the descriptions. Using subjects with higher mathematical/statistical knowledge such as advanced students from Mathematics, Statistics or Economy degrees could serve to better evaluate our hypothesis. This way, comprehension of the descriptions would increase not only due to the descriptions themselves, but also because of the subjects' ability to understand them.

If indeed the comprehension level of the descriptions does not make a difference in any of the suggested scenarios, we would still continue with the same question that gave rise to this study: why do we find this contradiction between several studies demonstrating the bigger importance of descriptions compared to experience [3–8,20–22] with those that show the opposite result [1,2]? Our experiment was not able to disentangle this problem.

In conclusion, the present study showed that [1] the description-experience gap was found in both tasks; [2] choice behavior from our *mixed group* replicated the results from Lejarraga and Gonzalez [2]; [3] using enriched descriptions had a significant effect on the *description group* in one of the tasks; [4] further research is needed in order to understand participants' comprehension of the descriptions of the options; and [5] our hypothesis for the contradiction in the results from the description-experience gap with those from the instructional control field did not find support in our results. This contradiction still remains as a question to be solved.

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